Claims

What is claimed is:

1. A method for displaying waveform data on a display of a computer system, the waveform data comprising a plurality of waveform signals, each waveform signal having at least one transition event, the method comprising:

for a waveform signal, providing at least one indexing element, each indexing element corresponding to a time range of the waveform data;

for each indexing element, providing a pointer into the waveform data;

for each indexing element, further providing a maximum interval value, wherein the maximum interval value indicates the maximum amount of time spanned between transition events of the waveform signal within the time range corresponding to the indexing element;

determining a minimum time resolution within which transition events of the waveform signal may be adequately resolved on the display;

within a first display region corresponding to a first indexing element having a maximum interval value that exceeds the minimum time resolution, using the pointer of the first indexing element to access and draw transition events for the waveform signal that are within the time range of the first indexing element to present a waveform for the waveform signal; and

within a second display region corresponding to a second indexing element having a maximum interval value that is less than the minimum time resolution, drawing a predetermined image in place of transition events for the waveform signal.

2. The method of claim 1 further comprising:

obtaining a first endpoint time that is the lesser of a first time-endpoint of the first display region, and a first time-endpoint of the first indexing element;

obtaining a first startpoint time that is the greater of a first time-startpoint of the first display region, and a first time-startpoint of the first indexing element; and

using the pointer of the first indexing element to access and draw all transition events of the waveform signal that are between the first startpoint time and the first endpoint time.

[c3] 3. The method of claim 1 further comprising:

obtaining a second endpoint time that is the lesser of a second time-endpoint of the second display region, and a second time-endpoint of the second indexing element;

obtaining a second startpoint time that is the greater of a second time-startpoint of the second display region, and a second time-startpoint of the second indexing element; and

drawing the predetermined image to span from the second startpoint time to the second endpoint time.

[c4] 4. The method of claim 1 further comprising:

for each indexing element, providing a special-state flag that indicates the presence of a special state of the waveform signal within the time range corresponding to the indexing element; and

within a third display region corresponding to a third indexing element having a special-state flag set to indicate the presence of a special state of the waveform signal, drawing a special image in the third display region.

[c5] 5. The method of claim 4 wherein the special state of the waveform signal includes an indeterminate value state of the waveform signal, or a tri-state value of the waveform signal.

[c6] 6. The method of claim 4 wherein transition events for the waveform signal are drawn in the third display region regardless of the maximum interval value of the third indexing element.

[c7] 7. A computer system comprising:

a memory for holding waveform data comprising a plurality of waveform signals, each waveform signal having at least one transition event;

a processor; and

program code stored in the memory and executable by the processor to perform the following:

for a waveform signal, providing at least one indexing element, each indexing element corresponding to a time range of the waveform data;

for each indexing element, providing a pointer into the waveform data;

for each indexing element, providing a maximum interval value, wherein the maximum interval value indicates the maximum amount of time spanned between transition events of the waveform signal within the time range corresponding to the indexing element;

determining a minimum time resolution within which transition events of the waveform signal may be adequately resolved on a display;

within a first display region corresponding to a first indexing element having a maximum interval value that exceeds the minimum time resolution, using the pointer of the first indexing element to access and draw transition events for the waveform signal that are within the time range of the first indexing element to present a waveform for the waveform signal on the display; and

within a second display region corresponding to a second indexing element having a maximum interval value that is less than the minimum time resolution, drawing a predetermined image on the display in place of transition events for the waveform signal.

[c8]   8. The computer system of claim 7 wherein the program code further contains instructions for:

obtaining a first endpoint time that is the lesser of a first time-endpoint of the first display region, and a first time-endpoint of the first indexing element;

obtaining a first startpoint time that is the greater of a first time-startpoint of the first display region, and a first time-startpoint of the first indexing element; and

using the pointer of the first indexing element to access and draw on the display all transition events of the waveform signal that are between the first startpoint time and the first endpoint time.

[c9]   9. The computer system of claim 7 wherein the program code further contains instructions for:

obtaining a second endpoint time that is the lesser of a second time-endpoint of the second display region, and a second time-endpoint of the second indexing element;

obtaining a second startpoint time that is the greater of a second time-startpoint of the second display region, and a second time-startpoint of the

second indexing element; and

drawing the predetermined image to span in the display from the second startpoint time to the second endpoint time.

[c1 0]   10. The computer system of claim 7 wherein the program code further contains instructions for:

for each indexing element, providing a special-state flag that indicates the presence of a special state of the waveform signal within the time range corresponding to the indexing element; and

within a third display region corresponding to a third indexing element having a special-state flag set to indicate the presence of a special state of the waveform signal, drawing a special image on the display in the third display region.

[c1 1]   11. The computer system of claim 10 wherein the special state of the waveform signal includes an indeterminate value state of the waveform signal, or a tri-state value of the waveform signal.

[c1 2]   12. The computer system of claim 10 wherein transition events for the waveform signal are drawn on the display in the third display region regardless of the maximum interval value of the third indexing element.

[c1 3]   13. A computer-readable media encoded with the program code of claim 7.